

# PATENT ABSTRACTS OF JAPAN

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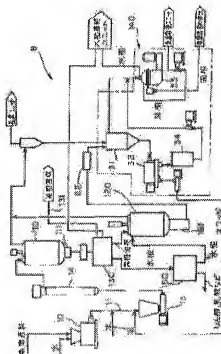
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## (54) FISH SCRAP TREATING EQUIPMENT AND FISH SCRAP TREATING METHOD

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide fish scrap treating equipment and a fish scrap treating method capable of efficiently recovering useful materials from fish scrap (mainly fish meat, entrails, bones, scales, etc.).

**SOLUTION:** This device is equipped with a breaker 10, a first reactor 110 which heats minced raw materials to 150 to 210° C, a first separating means 130 which separates the reaction treatment products subjected to a hydrothermal reaction in the first reactor 110 to a water phase, solid phase and oil phase or separates the same to the oil phase and the phases exclusive of the oil phase, a recovering means 150 which recovers water-soluble useful components, such as phosphoric acid and lactic acid, from the water phase separated by the first separating means or recovers the oil phase separated in the first separating process step, a second reactor 120 which heats the mixture composed of the solid phase and oil phase separated by the first separating means and the water phase after recovering the water-soluble useful components by the recovering means or the phase exclusive of the oil phase separated by the first separation to 230 to 280° C and a second separating means 140 which separates the useful materials from the reaction treatment products subjected to the hydrothermal reaction in the second reactor 120.



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## CLAIMS

[Claim(s)]

[Claim 1]A breaker which is a \*\*\*\* processing unit used in order to collect useful resources, such as fish oil, amino acid, various organic acid, from \*\*\*\*, and cracks a \*\*\*\* raw material in the shape of minced meat, A reactor which is cracked in the shape of minced meat with a breaker, and heats a minced meat-like raw material adjusted to a range whose moisture content is 60 to 92 % of the weight at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform, A \*\*\*\* processing unit providing separating mechanism which separates useful material from a reaction treatment object which carried out hydrothermal reaction in said reactor.

[Claim 2]The \*\*\*\* processing unit according to claim 1 having a preheating treatment means to heat-treat said minced meat-like raw material preparatorily before said reactor is presented.

[Claim 3]The \*\*\*\* processing unit according to claim 1 or 2, wherein said separating mechanism is what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in said reactor.

[Claim 4]While being a \*\*\*\* disposal method for collecting useful resources, such as fish oil, amino acid, various organic acid, from a \*\*\*\* raw material and cracking a \*\*\*\* raw material in the shape of minced meat, A minced meat-like raw material preparation process which adjusts moisture content to 60 to 92% of the weight of a raw, The 1st reaction process that heats a minced meat-like raw material prepared by said minced meat-like raw material preparation process at 150-200 \*\* under application of pressure and to which hydrothermal reaction is made to carry out, A reaction treatment object which carried out hydrothermal reaction in said 1st reaction process is divided into phases (henceforth "solid phase and an oil phase"), such as solid phase other than aqueous phase and aqueous phase, and an oil phase, Or from aqueous phase separated by the 1st partition process divided into phases other than an oil phase and an oil phase, and said 1st partition process. [ whether water-soluble useful components, such as phosphoric acid and lactic acid, are collected and ] Or a mixture of a recovery process which collects oil phases separated by said 1st partition process, solid phase and an oil phase which were separated by said 1st partition process, and aqueous phase after collecting water-soluble useful components by said recovery process, Or the 2nd reaction process that heats phases (aqueous phase and solid phase) other than an oil phase separated by said 1st partition process at 230-280 \*\* under application of pressure and to which hydrothermal reaction is made to carry out, A \*\*\*\* disposal method providing the 2nd partition process that separates useful material from a reaction treatment object which carried out hydrothermal reaction in said 2nd reaction process.

[Claim 5]A \*\*\*\* processing unit used in order to collect useful resources, such as fish oil, amino acid, various organic acid, from a \*\*\*\* raw material characterized by comprising the following.  
A breaker which makes a \*\*\*\* raw material the shape of minced meat.

The 1st reactor that is cracked in the shape of minced meat with a breaker, and heats a minced meat-like raw material adjusted to a range whose moisture content is 60 to 92 % of the weight at 150-200 \*\* under application of pressure and to which hydrothermal reaction is made to perform. The 1st separating mechanism that separates phases (henceforth "solid phase and an oil phase"), such as solid phase other than aqueous phase and aqueous phase, and an oil phase, or divides into phases other than an oil phase and an oil phase a reaction treatment object which carried out hydrothermal reaction in said 1st reactor.

Water-soluble useful components, such as phosphoric acid and lactic acid, are collected from aqueous phase separated by said 1st separating mechanism, Or a recovery means which collects oil phases separated by said 1st partition process, and solid phase and an oil phase which were

material from a reaction treatment object which carried out hydrothermal reaction in the 2nd reactor that heats phases (aqueous phase and solid phase) other than an oil phase separated by said 1st separating mechanism at 230–280 °C under application of pressure, and to which hydrothermal reaction is made to perform, and said 2nd reactor.

[Claim 6] The processing unit according to claim 5 having a preheating treatment means to heat-treat said minced meat-like raw material preparatorily before said 1st reactor is presented.

[Claim 7] The processing unit according to claim 5 or 6, wherein said 2nd separating mechanism is what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in said reactor.

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## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

[0001]

[Field of the Invention]The invention in this application useful material about the device for collecting from \*\*\*\* (mainly fish meat, the intestines, a bone, a scale, etc.) in detail. It is related with the \*\*\*\* processing unit and \*\*\*\* disposal method which enabled it to collect efficiently useful material, such as fish oil, amino acid, various organic acid, by heating a \*\*\*\* raw material under application of pressure, and making hydrothermal reaction perform.

[0002]

[Description of the Prior Art]In recent years, effective use, \*\* and others of the fish which it becomes impossible to abandon \*\*\*\* (fish meat, the intestines, a bone, a scale, etc.) to the ocean, and comes out of processing space, a fish market, etc. of a fish by a treaty or legal restrictions, or the method for processing so that it can recycle and equipment have come to be needed.

[0003]Conventionally, processing of \*\*\*\* is left to each local self-governing body.

The most was abandoned by the ocean.

However, since the sea dumping of \*\*\*\* was forbidden from January, 1996 by amendment of London Convention, in almost all self-governing bodies, it is the same treatment as a kitchen garbage, and the actual condition is performing incineration disposal. And as some using methods, it heat-treats under \*\* ordinary pressure, the method of collecting fish oil, the method of heat-treating under \*\* ordinary pressure and converting into the food and the manure of a farmed fish, etc. are proposed, for example, and the part is carried out.

[0004]

[Problem(s) to be Solved by the Invention]However, in the method of the above-mentioned \*\*, there is a problem that the recovering efficiency of fish oil is low, and the quality of the fish oil collected is not so good, either. In the method of the above-mentioned \*\*, it has come to develop into a serious problem for a local self-governing body and the related industry from economical efficiency [ in / the added value of the product obtained is low and / a relation with a processing cost ].

[0005]The invention in this application solves the above-mentioned problem, and an object of the invention in this application is to provide the \*\*\*\* processing unit and \*\*\*\* disposal method which can collect useful material efficiently from \*\*\*\* (mainly fish meat, the intestines, a bone, a scale, etc.).

[0006]

[Means for Solving the Problem]To achieve the above objects, this invention is characterized by that a \*\*\*\* processing unit used in order that a \*\*\*\* processing unit of the invention in this application (Claim 1) may collect useful resources, such as fish oil, amino acid, various organic acid, from \*\*\*\* comprises the following.

A breaker which cracks a \*\*\*\* raw material in the shape of minced meat.

A reactor which is cracked in the shape of minced meat with a breaker, and heats a minced meat-like raw material adjusted to a range whose moisture content is 60 to 92 % of the weight at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform.

Separating mechanism which separates useful material from a reaction treatment object which carried out hydrothermal reaction in said reactor.

[0007]A breaker with which a \*\*\*\* processing unit of the invention in this application (Claim 1) makes a \*\*\*\* raw material the shape of minced meat, A reactor which heats a minced meat-like raw material with which moisture content was adjusted at 200-280 \*\* under application of pressure and

aqueous phase, and at least one phase in solid phase, By heating \*\*\*\* to subcritical temperature and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, It becomes possible efficiently separation and to collect or to collect aqueous phase which useful components, such as nutriment, dissolved about an oil phase which contains fatty acid, such as DHA contained in \*\*\*\*, and EPA, at a high rate, and enables it for most to process efficiently \*\*\*\* by which incineration processing was carried out, and to carry out useful recycling conventionally.

[0008]In the invention in this application, \*\*\*\* is a large concept containing the body of a fish, a head of a fish, a bone, internal organs, a hide, a scale, etc., and there are no restrictions special to a ratio of each part, etc. In the invention in this application, a breaker is the shape of minced meat (with "the shape of minced meat") about a \*\*\*\* raw material. In the invention in this application, it is not what is restricted in the case of what is called a minced meat state, It is possible to use a thing of various mechanisms which MINSA etc. which are carried out for being with a large concept including granular type voice etc. which were broken finely are meant, and there are no restrictions special to the concrete composition, and can crack and split-ize a \*\*\*\* raw material.

[0009]In the invention in this application, it is possible to use as a reactor an autoclave type thing provided with an agitator and a thing of various structures, such as a reactor (tube type reactor) of structure where a tube of predetermined length was bent in the shape of a winding path. When it is considered as structure which carries out the flange connection of the important section when using a tube type reactor and enables it to separate a straight pipe part and a bent part, while becoming possible to correspond promptly at the time of a blockade, etc., it becomes possible to maintain easily. Since it will become possible to make it react efficiently in short time while becoming easy to respond to continuation-ization if a tube type reactor is used, it becomes possible to attain miniaturization of a device and it becomes possible to reduce facility cost.

[0010]In the invention in this application, separating mechanism is a concept meaning a means which can separate and collect an oil phase, aqueous phase, and at least one phases in solid phase from a reaction treatment object which carried out hydrothermal reaction in a reactor. It is possible to use various means which can separate useful material from a reaction treatment object as separating mechanism, and there are no restrictions special to the concrete composition.

[0011]Solid phase which can be collected in a \*\*\*\* processing unit of the invention in this application is a substance originating in a bone, a fin, etc. of a fish. Useful components, such as calcium phosphate, are contained in this solid phase. Aqueous phase contains nutriments, such as amino acid, such as lactic acid and peptide, various organic acid, and water soluble protein. An oil phase contains high fatty acid of especially added value like DHA or EPA, etc.

[0012]That cooking temperature of a reactor is 200-280 \*\* in the invention in this application, If amino acid callable originally or various organic acid, fish oil, etc. cannot fully be collected and cooking temperature exceeds 280 \*\* when cooking temperature is less than 200 \*\*, it will be because a generated amount of fish oil containing a high-value-added substance decreases and a generated amount of amino acid contained in aqueous phase also decreases. However, it is important for a reaction temperature region to give width to an operating-temperature region by the side of a processing unit from there being a suitable field according to a fish stock, a season, etc. according to each conditions.

[0013]Although reaction time calls at cooking temperature, a part of \*\*\*\*, etc., it is usually desirable to be referred to as about 10-15 min. However, there are no restrictions special to reaction time.

[0014]Trying to adjust moisture content to 60 to 92% of the weight of a range. If mobility will fall, handling will become difficult, if moisture content will be 60 or less % of the weight, and moisture content exceeds 92 % of the weight, handling quantity, such as the amount of supply to a reactor, will increase, enlargement of equipment will be caused, and it will be because it is not desirable.

[0015]Before said reactor is presented with a \*\*\*\* processing unit of Claim 2, it is characterized by having a preheating treatment means to heat-treat said minced meat-like raw material preparatorily.

[0016]It becomes possible by forming a preheating treatment means, and heat-treating a minced meat-like raw material preparatorily, before a reactor is presented to raise contacting efficiency with water of a subcritical state, and to make an efficient hydrolysis reaction perform. Therefore, directly, when supplying an unheated minced meat-like raw material to a hot reactor, it is compared, it becomes possible to make hydrothermal reaction stable in a reactor perform, and the invention in this application can be effected more.

[0017]A \*\*\*\* processing unit of Claim 3 is characterized by said separating mechanism being what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in said reactor.

separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in a reactor as separating mechanism like Claim 3. It is also possible to use separating mechanism which is one unified mechanism which can separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object as separating mechanism, for example. In a case where it is possible to separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object, For example, it is also possible to use a thing etc. of composition of to have had the first step of separation mechanism which separates only any one phase of an oil phase, aqueous phase, and the solid phase, and a separation mechanism which separates two phases which remained after that from a reaction treatment object, and there are no restrictions special to the concrete composition.

[0019]This invention is characterized by that a \*\*\*\* disposal method for a \*\*\*\* disposal method of the invention in this application (Claim 4) to collect useful resources, such as fish oil, amino acid, various organic acid, from a \*\*\*\* raw material comprises:

A minced meat-like raw material preparation process which adjusts moisture content to 60 to 92% of the weight of a range while cracking a \*\*\*\* raw material in the shape of minced meat.

The 1st reaction process that heats a minced meat-like raw material prepared by said minced meat-like raw material preparation process at 150-200 \*\* under application of pressure and to which hydrothermal reaction is made to carry out.

The 1st partition process that divides a reaction treatment object which carried out hydrothermal reaction in said 1st reaction process into phases (henceforth "solid phase and an oil phase"), such as solid phase other than aqueous phase and aqueous phase, and an oil phase, or is divided into phases other than an oil phase and an oil phase.

From aqueous phase separated by said 1st partition process. [ whether water-soluble useful components, such as phosphoric acid and lactic acid, are collected and ] Or a mixture of a recovery process which collects oil phases separated by said 1st partition process, solid phase and an oil phase which were separated by said 1st partition process, and aqueous phase after collecting water-soluble useful components by said recovery process, Or the 2nd reaction process that heats phases (aqueous phase and solid phase) other than an oil phase separated by said 1st partition process at 230-280 \*\* under application of pressure and to which hydrothermal reaction is made to carry out and the 2nd partition process that separates useful material from a reaction treatment object which carried out hydrothermal reaction in said 2nd reaction process.

[0020]A minced meat-like raw material which made a \*\*\*\* raw material the shape of minced meat, and adjusted moisture content by the 1st reaction process. Heat at 150-200 \*\* under application of pressure, make hydrothermal reaction perform, and a reaction treatment object by the 1st partition process. [ whether it separates into aqueous phase, and solid phase and an oil phase, and ] Or from aqueous phase separated by a recovery process after separating into phases other than an oil phase and an oil phase. [ whether useful components, such as phosphoric acid and lactic acid, are collected and ] By or the 2nd reaction process after collecting oil phases separated by the 1st partition process. A mixture of solid phase and an oil phase separated in the 1st partition process, and aqueous phase after collecting water-soluble useful components by a recovery process, Or it becomes possible to separate and collect useful material from a reaction treatment object efficiently by heating phases other than an oil phase separated in the 1st partition process at 230-280 \*\* under application of pressure, and making hydrothermal reaction perform.

[0021]Namely, a mixture of the 1st reaction process made to react at 150-200 \*\*, solid phase and an oil phase which were separated by the 1st partition process, and aqueous phase after collecting water-soluble useful components by a recovery process, Or when it has composition provided with the 2nd reaction process to which phases other than an oil phase separated by the 1st partition process are made to react at 230-280 \*\*, (a) While collecting water-soluble useful components of phosphoric acid, lactic acid, protein, etc. from aqueous phase separated by the 1st reaction process in a comparatively low temperature (150-200 \*\*), Solid phase and an oil phase separated by the 1st partition process, and aqueous phase after collecting useful components by a water-soluble useful component recovery process by carrying out hydrothermal reaction at an elevated temperature (230-280 \*\*) by the 2nd reaction process, Become possible to separate and collect efficiently high useful material of added value of fish oil, amino acid, various organic acid, etc., etc., and a reaction treatment object which carried out hydrothermal reaction in the (b) 1st reaction process is divided into phases other than an oil phase and an oil phase, While collecting oil phases, it becomes possible to separate and collect efficiently high useful material of added value of fish oil, amino acid, various

solid phase) other than an oil phase separated by the 1st partition process at an elevated temperature (230-280 \*\*) according to the 2nd reaction process. Corresponding to a difference in a \*\*\*\* raw material (a kind of fish, and a difference in a part), etc., a processing mode of the above (a) and (b) is a mode which can be chosen suitably, and can determine whether to consider it as which mode according to concrete conditions.

[0022] That cooking temperature of the 1st reaction process is 150-200 \*\* in a \*\*\*\* disposal method of the invention in this application (Claim 4), If there is much ullage of solid content, and amino acid callable originally or various organic acid, fish oil, etc. cannot fully be collected and cooking temperature exceeds 200 \*\* when cooking temperature is less than 150 \*\*, it will be because a recovery amount of lactic acid and phosphoric acid which are contained in aqueous phase decreases.

[0023] It will be because a generated amount of fish oil or amino acid decreases that cooking temperature of the 2nd reaction process is 230-280 \*\*, if it becomes insufficient generating of useful fish oil or various amino acid and cooking temperature exceeds 280 \*\*, when cooking temperature is less than 230 \*\*. Although reaction time in the 1st reaction process calls at a part of \*\*\*\*, etc., Usually, it is possible to make a reaction required as the 1st reaction process perform at about 5-10 min, and although reaction time in the 2nd reaction process calls at a part of \*\*\*\*, etc., it is possible [ reaction time ] to make reaction sufficient by about 10-15 min usually perform.

[0024] This invention is characterized by that a \*\*\*\* processing unit used in order that a \*\*\*\* processing unit of the invention in this application (Claim 5) may collect useful resources, such as fish oil, amino acid, various organic acid, from a \*\*\*\* raw material comprises:

A breaker which makes a \*\*\*\* raw material the shape of minced meat.

The 1st reactor that is cracked in the shape of minced meat with a breaker, and heats a minced meat-like raw material adjusted to a range whose moisture content is 60 to 92 % of the weight at 150-200 \*\* under application of pressure and to which hydrothermal reaction is made to perform.

The 1st separating mechanism that solid phase other than aqueous phase and aqueous phase, an oil phase, etc. carry out phase (henceforth "solid phase and oil phase") separation of the reaction treatment object which carried out hydrothermal reaction in said 1st reactor, or is divided into phases other than an oil phase and an oil phase.

Water-soluble useful components, such as phosphoric acid and lactic acid, are collected from aqueous phase separated by said 1st separating mechanism. Or a recovery means which collects oil phases separated by said 1st partition process, and solid phase and an oil phase which were separated by said 1st separating mechanism. A mixture of aqueous phase after said recovery means recovers a water-soluble useful component. Or the 2nd separating mechanism that separates useful material from a reaction treatment object which carried out hydrothermal reaction in the 2nd reactor that heats phases (aqueous phase and solid phase) other than an oil phase separated by said 1st separating mechanism at 230-280 \*\* under application of pressure, and to which hydrothermal reaction is made to perform, and said 2nd reactor.

[0025] A \*\*\*\* processing unit of the invention in this application (Claim 5) as mentioned above A breaker, A reaction treatment object which carried out hydrothermal reaction in the 1st reactor that heats a minced meat-like raw material at 150-200 \*\*, and to which hydrothermal reaction is made to perform, and the 1st reactor is divided into solid phase and oil phases other than aqueous phase and aqueous phase, Or from aqueous phase separated by the 1st separating mechanism divided into phases other than an oil phase and an oil phase, and the 1st separating mechanism. [ whether water-soluble useful components, such as phosphoric acid and lactic acid, are collected and ] Or a mixture of a recovery means which collects oil phases separated by the 1st partition process, solid phase and an oil phase which were separated by the 1st separating mechanism, and aqueous phase after a recovery means recovers a water-soluble useful component. Or the 2nd reactor that heats phases (aqueous phase and solid phase) other than an oil phase separated by the 1st separating mechanism at 230-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform, Since it has the 2nd separating mechanism that separates useful material from a reaction treatment object which carried out hydrothermal reaction in the 2nd reactor, it becomes possible to enforce a \*\*\*\* disposal method of Claim 4 certainly, and to separate and collect efficiently high useful material of added value of fish oil, amino acid, various organic acid, etc., etc. from \*\*\*\*.

[0026] Before said 1st reactor is presented with a \*\*\*\* processing unit of Claim 6, it is characterized by having a preheating treatment means to heat-treat said minced meat-like raw material preparatorily.

[0027] It becomes possible by forming a preheating treatment means, and heat-treating a minced

efficiency with water of a subcritical state, and to make an efficient hydrolysis reaction perform. Therefore, directly, when supplying an unheated minced meat-like raw material to the 1st reactor, it is compared, it becomes possible to make hydrothermal reaction stable in the 1st reactor perform, and the invention in this application can be effected more.

[0028]A \*\*\*\* processing unit of Claim 7 is characterized by said 2nd separating mechanism being what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in said reactor.

[0029]In a \*\*\*\* processing unit of the invention in this application, it is possible to use what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in a reactor as the 2nd separating mechanism like Claim 7. It is also possible to use separating mechanism which is one unified mechanism which can separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object as separating mechanism, for example. In a case where it is possible to separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object, For example, it is also possible to use a thing etc. of composition of to have had the first step of separation mechanism which separates only any one phase of an oil phase, aqueous phase, and the solid phase, and a separation mechanism which separates two phases which remained after that from a reaction treatment object, and there are no restrictions special to the concrete composition.

[0030]

[Embodiment of the Invention]The place which shows the embodiment of the invention in this application and by which it is characterized [ the ] hereafter is explained in more detail.

[0031][Embodiment 1] Drawing 1 is a figure showing the composition of the \*\*\*\* processing unit concerning one embodiment of the invention in this application. The \*\*\*\* processing unit A of this embodiment is provided with the following.

The breaker 10 which is a device for collecting useful resources, such as fish oil, amino acid, various organic acid, from oh [ fish ] (the head of a fish, a bone, internal organs, a hide, a scale, etc.), and cracks a \*\*\*\* raw material in the shape of minced meat.

The reactor 20 which heats the minced meat-like raw material cracked in the shape of minced meat with the breaker 10 at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform.

Separating mechanism 30 which separates useful material from the reaction treatment object which carried out hydrothermal reaction in the reactor 20.

Although the autoclave type thing provided with the agitator is used as the reactor 20 in this embodiment, it is also possible to use the tube type reactor of the structure where the tube of predetermined length was bent in the shape of a winding path. Since the content of a solid decreases extremely depending on the kind of \*\*\*\*, the decanter 32, the three-phase-circuit separator 33, the cushion tank 34, etc. which constitute separating mechanism may become unnecessary.

[0032]And in this \*\*\*\* processing unit A, in order to adjust the moisture content of a minced meat-like raw material (for example, it adjusts to 60 to 92 % of the weight of water content), the feed water line 12 which supplies water to the supply line 11 of the minced meat-like raw material cracked in the shape of minced meat with the breaker 10 is allocated. It is also possible for there to be no restrictions in particular in the addition position of water, and to constitute as additive water required for the breaker 10, so that the aqueous phase after separation may be reused.

[0033]Through the slurry pump 13, the minced meat-like raw material is constituted so that the reactor 20 may be supplied, and before the reactor 20, the preheating treatment means (pre cooker) 14 for heat-treating a minced meat-like raw material preparatorily is allocated. The condenser 21 is allocated by the lower part of the reactor 20, and the pressure reduction system 22 is allocated in the outlet side of the reactor 20.

[0034]The decanter 32 as for which the separating mechanism 30 decants separated liquid with a high rate of solid phase of having been separated by the separation tank 31 and the separation tank 31, While supplying the upper layer liquid of the separation tank 31 and performing separation of an oil phase and the aqueous phase, it comprises the three-phase-circuit separator 33 etc. which also perform separation of a little solid phase. Sludge with high solid phase part concentration separated with the decanter 32 is constituted so that it may be returned to the supply line 11 of a minced meat-like raw material. After being able to store to the cushion tank 34, the aqueous phase containing a little oil phases separated with the decanter 32 is constituted so that it may be sent to the three-phase-circuit separator 33.

[0035]After processing a \*\*\*\* raw material in the shape of minced meat with the breaker 10, using



which adjusted moisture content is supplied to the reactor 20, While the high oil phase of the added value containing good organic acid etc. is recoverable from a reaction treatment object by heating and carrying out hydrothermal reaction (subcritical hydration moisture solution reaction) to 200–280 \*\* under application of pressure, it becomes possible to collect the aqueous phase which water soluble protein dissolved. Although the solid phase to which the aqueous phase adhered is discharged from the three-phase-circuit separator 33, it is possible to also dry this solid phase and to use as manure or feed.

[0036][Embodiment 2] Drawing 2 is a figure showing the composition of the \*\*\*\* processing unit concerning other embodiments of the invention in this application. The breaker 10 which the \*\*\*\* processing unit B of this Embodiment 2 is a device for collecting useful resources, such as organic acid, from oh [ fish ] (the head of a fish, a bone, internal organs, a hide, a scale, etc.), and cracks a \*\*\*\* raw material in the shape of minced meat, The 1st reactor 110 that heats a minced meat-like raw material at 150–200 \*\* and to which hydrothermal reaction is made to perform, The 1st separating mechanism 130 that divides into solid phase and oil phases other than the aqueous phase and the aqueous phase the reaction treatment object which carried out hydrothermal reaction in the 1st reactor 110, The recovery means 150 which collects useful components, such as phosphoric acid and lactic acid, from the aqueous phase separated by the 1st separating mechanism 130, The 2nd reactor 120 that heats the solid phase and oil phase separated by the 1st separating mechanism 130, and the aqueous phase after the recovery means 150 recovers a useful component at 230–280 \*\* and to which hydrothermal reaction is made to perform, From the reaction treatment object which carried out hydrothermal reaction in the 2nd reactor 120, it has the 2nd separating mechanism 140 that separates useful material. The condenser 111, 121 is allocated by the lower part of the 1st reactor 110 and the 2nd reactor 120, respectively. It is also possible to have composition which formed the oil phase recovery line 131 for collecting oil phases to the 1st separating mechanism 130. [0037] This Embodiment 2 uses the thing of an autoclave type structure provided with the agitator as the reactors 110 and 120, and it is also possible to use the tube type reactor of the structure where the tube of predetermined length was bent in the shape of a winding path. By continuation-izing a process, using a tube type reactor as a reactor, hydrothermal reaction is made to perform efficiently and it becomes possible to attain miniaturization of a device.

[0038] The decanter 32 which decants separated liquid with a high rate of the solid phase which the 2nd separating mechanism 140 is constituted like the separating mechanism 30 of the above-mentioned Embodiment 1, and was separated by the separation tank 31 and the separation tank 31, While supplying the upper layer liquid of the separation tank 31 and performing separation of an oil phase and the aqueous phase, it has the three-phase-circuit separator 33 etc. which also perform separation of a little solid phase.

[0039] Other composition is the same as the composition of the \*\*\*\* processing unit A of the above-mentioned Embodiment 1 shown in drawing 1, and in order to avoid duplication, explanation of each part is omitted. In drawing 2, the portion which attached drawing 1 and identical codes shows the same portion as drawing 1, or the corresponding portion.

[0040] After processing a \*\*\*\* raw material in the shape of minced meat with the breaker 10 using the \*\*\*\* processing unit B of the above-mentioned embodiment, the minced meat-like raw material which adjusted moisture content is supplied to the 1st reactor 110, After heating at 150–200 \*\* under application of pressure and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, a reaction treatment object The aqueous phase, The solid phase and oil phase which separated into portions, such as solid phase other than the aqueous phase, and an oil phase, and was separated from the separated aqueous phase by the 1st separating mechanism 130 after collecting useful components, such as phosphoric acid and lactic acid, By supplying the aqueous phase after the water-soluble useful component recovery means 150 recovers a useful component to the 2nd reactor 120, heating it at 230–280 \*\* under application of pressure, and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, While the high oil phase of the added value containing good organic acid etc. is efficiently recoverable, the aqueous phase which water soluble protein dissolved is efficiently recoverable. Although the solid phase to which the aqueous phase adhered is discharged from the three-phase-circuit separator 33, this solid phase can also be dried and it can use as manure or feed.

[0041] The solid phase and oil phase separated by the 1st partition process while collecting useful components, such as phosphoric acid and lactic acid, from the aqueous phase in the above-mentioned embodiment, after dividing a reaction treatment object into the aqueous phase, and solid phase and an oil phase with the 1st partition process. Although the mixture of the aqueous phase

under application of pressure by the 2nd reaction process and he is trying to make hydrothermal reaction perform, It is the 1st partition process about the reaction treatment object after making the kind of \*\*\*\* raw material, etc. perform hydrothermal reaction by the 1st reaction process, After separating into phases other than an oil phase and an oil phase and collecting oil phases, phases other than the oil phase separated by the 1st partition process by the 2nd reaction process. It heats at 230-280 \*\* under application of pressure, and it is also possible to constitute so that hydrothermal reaction may be made to perform, and useful material can be efficiently separated and collected from a reaction treatment object also in such a case.

[0042]As mentioned above, in the \*\*\*\* processing unit B of this Embodiment 2, Since it has composition provided with two reactors, the 1st reactor 110 and the 2nd reactor 120, compared with the case where it is made to react in one step, it becomes possible like [ in the case of the above-mentioned Embodiment 1 ] to collect useful material, such as still more efficient and good organic acid.

[0043]Oh [ the \*\*\*\* processing unit B of this Embodiment 2 is used, and / fish ] (70% of internal organs)! When the minced meat-like \*\*\*\* raw material (57% of moisture content) prepared from 30% of the bony septum is processed at a rate of 20 kg/hr, from the aqueous phase separated in the \*\* 1st separating mechanism. In [ phosphoric acid is collected by 0.12 kg/hr and lactic acid is collected at a rate of 0.05 kg/hr, and ] the \*\* 2nd separating mechanism, The oil phase containing DHA, EPA, etc. (a) 2.7 kg/hr, (b) water soluble protein, and pyroglutamic acid, The aqueous phase containing organic acid, such as an alanine, a glycine, and cystine, amino acid, water soluble protein, etc. was collected by 11.4 kg/hr, and (c) solid content was collected at a rate of 4.87 kg/hr.

[0044]The invention in this application is not what is limited to each of above-mentioned Embodiments 1 and 2, the kind of \*\*\*\* which should be processed, and a part (for example, the kind of fish by the texture of a fish white [ such as a fish of lean, such as a tuna, a sea bream, and a bastard halibut, ] etc..) Breakers, such as parts, such as the head, internal organs, and a bone, and a ratio of those, a reactor (the 1st reactor and the 2nd reactor), The form of each members forming, such as separating mechanism, structure, the moisture content of a minced meat-like raw material, It is possible for it to be related with the kind etc. of the oil phase which should be separated and collected, the aqueous phase, and solid phase, and to add various application and modification within the limits of the gist of an invention from the existence of a preheating treatment means which heat-treats preparatorily terms and conditions, such as reaction temperature, a pressure, reaction time, and a minced meat-like raw material, and the reaction treatment object which carried out hydrothermal reaction.

[0045]

[Effect of the Invention]As mentioned above, the \*\*\*\* processing unit of the invention in this application (Claim 1), The breaker which makes a \*\*\*\* raw material the shape of minced meat, and the reactor which heat the minced meat-like raw material with which moisture content was adjusted at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform, From the reaction treatment object which carried out hydrothermal reaction in the reactor, it has the separating mechanism which separates an oil phase, the aqueous phase, and at least one phase in solid phase, By heating \*\*\*\* to subcritical temperature and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, It becomes possible efficiently separation and to collect or to collect the aqueous phase which useful components, such as nutriment, dissolved about the oil phase which contains fatty acid, such as DHA contained in \*\*\*\*, and EPA, at a high rate, and \*\*\*\* is processed efficiently and useful recycling can be carried out now.

[0046]A preheating treatment means is formed like the \*\*\*\* processing unit of Claim 2, When a minced meat-like raw material is preparatorily heat-treated before the reactor was presented, directly, when supplying an unheated minced meat-like raw material to a hot reactor, it is compared, it becomes possible to make the hydrothermal reaction stable in the reactor perform, and it becomes possible to effect the invention in this application more.

[0047]In the \*\*\*\* processing unit of the invention in this application, it is possible to use what separates an oil phase, the aqueous phase, and at least one phase in solid phase from the reaction treatment object which carried out hydrothermal reaction in the reactor as separating mechanism like Claim 3. However, in the invention in this application, there are no special restrictions in the concrete composition of separating mechanism.

[0048]The \*\*\*\* disposal method of the invention in this application (Claim 4), The minced meat-like raw material which made the \*\*\*\* raw material the shape of minced meat, and adjusted moisture content by the 1st reaction process. Heat at 150-200 \*\* under application of pressure, make

[ whether it separates into the aqueous phase, and solid phase and an oil phase, and ] Or from the aqueous phase separated by the recovery process after separating into phases other than an oil phase and an oil phase. [ whether useful components, such as phosphoric acid and lactic acid, are collected and ] By or the 2nd reaction process after collecting the oil phases separated by the 1st partition process. The mixture of the solid phase and oil phase separated in the 1st partition process, and the aqueous phase after collecting water-soluble useful components by a recovery process, Or since phases other than the oil phase separated in the 1st partition process are heated at 230-280 \*\* under application of pressure and he is trying to make hydrothermal reaction perform, it becomes possible to separate and collect useful material from a reaction treatment object efficiently. [0049]Namely, the solid phase and oil phase separated by the 1st partition process while collecting useful components, such as phosphoric acid and lactic acid, from the aqueous phase, after being the 1st partition process and dividing a reaction treatment object into the aqueous phase, and solid phase and an oil phase depending on the kind of \*\*\*\* raw material, The mixture of the aqueous phase after collecting water-soluble useful components by a recovery process by the 2nd reaction process. The reaction treatment object after it is possible to heat at 230-280 \*\* under application of pressure, and to also make hydrothermal reaction perform and making hydrothermal reaction perform by the 1st reaction process by the 1st partition process. After separating into phases other than an oil phase and an oil phase and collecting oil phases, phases other than the oil phase separated by the 1st partition process by the 2nd reaction process. It heats at 230-280 \*\* under application of pressure, and it is also possible to constitute so that hydrothermal reaction may be made to perform, and, in any case, useful material can be efficiently separated and collected from a reaction treatment object.

[0050]The \*\*\*\* processing unit of the invention in this application (Claim 5), As mentioned above, a breaker and the 1st reactor that heat a minced meat-like raw material at 150-200 \*\* and to which hydrothermal reaction is made to perform, The reaction treatment object which carried out hydrothermal reaction in the 1st reactor is divided into solid phase and oil phases other than the aqueous phase and the aqueous phase, Or from the aqueous phase separated by the 1st separating mechanism divided into phases other than an oil phase and an oil phase, and the 1st separating mechanism. [ whether water-soluble useful components, such as phosphoric acid and lactic acid, are collected and ] Or the mixture of the recovery means which collects the oil phases separated by the 1st partition process, the solid phase and oil phase which were separated by the 1st separating mechanism, and the aqueous phase after a recovery means recovers a water-soluble useful component, Or the 2nd reactor that heats phases (aqueous phase and solid phase) other than the oil phase separated by the 1st separation at 230-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform, Since it has the 2nd separating mechanism that separates useful material from the reaction treatment object which carried out hydrothermal reaction in the 2nd reactor, The \*\*\*\* disposal method of Claim 4 is enforced certainly, efficiently, it can dissociate and the high useful material of the added value of fish oil, amino acid, various organic acid, etc., etc. can be collected now from \*\*\*\*.

[0051]By forming a preheating treatment means, and heat-treating a minced meat-like raw material preparatorily like the \*\*\*\* processing unit of Claim 6, before the 1st reactor is presented, Directly, when supplying an unheated minced meat-like raw material to the 1st reactor, it is compared, it becomes possible to make the hydrothermal reaction stable in the 1st reactor perform, and the invention in this application can be effected more.

[0052]In the \*\*\*\* processing unit of the invention in this application, it is possible to use what separates an oil phase, the aqueous phase, and at least one phase in solid phase from the reaction treatment object which carried out hydrothermal reaction in the reactor as the 2nd separating mechanism like Claim 7. It is also possible to use separating mechanism which is one unified mechanism which can separate and collect each of an oil phase, the aqueous phase, and solid phase from a reaction treatment object.

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TECHNICAL FIELD

[Field of the Invention]The invention in this application useful material about the device for collecting from \*\*\* (mainly fish meat, the intestines, a bone, a scale, etc.) in detail, It is related with the \*\*\* processing unit and \*\*\* disposal method which enabled it to collect efficiently useful material, such as fish oil, amino acid, various organic acid, by heating a \*\*\* raw material under application of pressure, and making hydrothermal reaction perform.

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PRIOR ART

[Description of the Prior Art]In recent years, effective use, \*\* and others of the fish which it becomes impossible to abandon \*\*\*\* (fish meat, the intestines, a bone, a scale, etc.) to the ocean, and comes out of processing space, a fish market, etc. of a fish by a treaty or legal restrictions, or the method for processing so that it can recycle and equipment have come to be needed.

[0003]Conventionally, processing of \*\*\*\* is left to each local self-governing body.

The most was abandoned by the ocean.

However, since the sea dumping of \*\*\*\* was forbidden from January, 1996 by amendment of London Convention, in almost all self-governing bodies, it is the same treatment as a kitchen garbage, and the actual condition is performing incineration disposal. And as some using methods, it heat-treats under \*\* ordinary pressure, the method of collecting fish oil, the method of heat-treating under \*\* ordinary pressure and converting into the food and the manure of a farmed fish, etc. are proposed, for example, and the part is carried out.

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## EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, the \*\*\*\* processing unit of the invention in this application (Claim 1), The breaker which makes a \*\*\*\* raw material the shape of minced meat, and the reactor which heat the minced meat-like raw material with which moisture content was adjusted at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform, From the reaction treatment object which carried out hydrothermal reaction in the reactor, it has the separating mechanism which separates an oil phase, the aqueous phase, and at least one phase in solid phase.

By heating \*\*\*\* to subcritical temperature and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, It becomes possible efficiently separation and to collect or to collect the aqueous phase which useful components, such as nutriment, dissolved about the oil phase which contains fatty acid, such as DHA contained in \*\*\*\*, and EPA, at a high rate, and \*\*\*\* is processed efficiently and useful recycling can be carried out now.

[0046] A preheating treatment means is formed like the \*\*\*\* processing unit of Claim 2, When a minced meat-like raw material is preparatorily heat-treated before the reactor was presented, directly, when supplying an unheated minced meat-like raw material to a hot reactor, it is compared, it becomes possible to make the hydrothermal reaction stable in the reactor perform, and it becomes possible to effect the invention in this application more.

[0047] In the \*\*\*\* processing unit of the invention in this application, it is possible to use what separates an oil phase, the aqueous phase, and at least one phase in solid phase from the reaction treatment object which carried out hydrothermal reaction in the reactor as separating mechanism like Claim 3. However, in the invention in this application, there are no special restrictions in the concrete composition of separating mechanism.

[0048] The \*\*\*\* disposal method of the invention in this application (Claim 4), The minced meat-like raw material which made the \*\*\*\* raw material the shape of minced meat, and adjusted moisture content by the 1st reaction process. Heat at 150-200 \*\* under application of pressure, make hydrothermal reaction perform, and a reaction treatment object by the 1st partition process.

[ whether it separates into the aqueous phase, and solid phase and an oil phase, and ] Or from the aqueous phase separated by the recovery process after separating into phases other than an oil phase and an oil phase. [ whether useful components, such as phosphoric acid and lactic acid, are collected and ] By or the 2nd reaction process after collecting the oil phases separated by the 1st partition process. The mixture of the solid phase and oil phase separated in the 1st partition process, and the aqueous phase after collecting water-soluble useful components by a recovery process, Or since phases other than the oil phase separated in the 1st partition process are heated at 230-280 \*\* under application of pressure and he is trying to make hydrothermal reaction perform, it becomes possible to separate and collect useful material from a reaction treatment object efficiently.

[0049] Namely, the solid phase and oil phase separated by the 1st partition process while collecting useful components, such as phosphoric acid and lactic acid, from the aqueous phase, after being the 1st partition process and dividing a reaction treatment object into the aqueous phase, and solid phase and an oil phase depending on the kind of \*\*\*\* raw material. The mixture of the aqueous phase after collecting water-soluble useful components by a recovery process by the 2nd reaction process. The reaction treatment object after it is possible to heat at 230-280 \*\* under application of pressure, and to also make hydrothermal reaction perform and making hydrothermal reaction perform by the 1st reaction process by the 1st partition process. After separating into phases other than an oil phase and an oil phase and collecting oil phases, phases other than the oil phase separated by the

and, in any case, useful material can be efficiently separated and collected from a reaction treatment object.

[0050]The \*\*\*\* processing unit of the invention in this application (Claim 5), As mentioned above, a breaker and the 1st reactor that heat a minced meat-like raw material at 150-200 °C and to which hydrothermal reaction is made to perform, The reaction treatment object which carried out hydrothermal reaction in the 1st reactor is divided into solid phase and oil phases other than the aqueous phase and the aqueous phase, Or from the aqueous phase separated by the 1st separating mechanism divided into phases other than an oil phase and an oil phase, and the 1st separating mechanism. [ whether water-soluble useful components, such as phosphoric acid and lactic acid, are collected and ] Or the mixture of the recovery means which collects the oil phases separated by the 1st partition process, the solid phase and oil phase which were separated by the 1st separating mechanism, and the aqueous phase after a recovery means recovers a water-soluble useful component, Or the 2nd reactor that heats phases (aqueous phase and solid phase) other than the oil phase separated by the 1st separation at 230-280 °C under application of pressure and to which hydrothermal reaction is made to perform, Since it has the 2nd separating mechanism that separates useful material from the reaction treatment object which carried out hydrothermal reaction in the 2nd reactor, The \*\*\*\* disposal method of Claim 4 is enforced certainly, efficiently, it can dissociate and the high useful material of the added value of fish oil, amino acid, various organic acid, etc., etc. can be collected now from \*\*\*\*.

[0051]By forming a preheating treatment means, and heat-treating a minced meat-like raw material preparatorily like the \*\*\*\* processing unit of Claim 6, before the 1st reactor is presented, Directly, when supplying an unheated minced meat-like raw material to the 1st reactor, it is compared, it becomes possible to make the hydrothermal reaction stable in the 1st reactor perform, and the invention in this application can be effected more.

[0052]In the \*\*\*\* processing unit of the invention in this application, it is possible to use what separates an oil phase, the aqueous phase, and at least one phase in solid phase from the reaction treatment object which carried out hydrothermal reaction in the reactor as the 2nd separating mechanism like Claim 7. It is also possible to use separating mechanism which is one unified mechanism which can separate and collect each of an oil phase, the aqueous phase, and solid phase from a reaction treatment object.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, in the method of the above-mentioned \*\*, there is a problem that the recovering efficiency of fish oil is low, and the quality of the fish oil collected is not so good, either. In the method of the above-mentioned \*\*, it has come to develop into a serious problem for a local self-governing body and the related industry from economical efficiency [ in / the added value of the product obtained is low and / a relation with a processing cost ].

[0005]The invention in this application solves the above-mentioned problem, and an object of the invention in this application is to provide the \*\*\*\* processing unit and \*\*\*\* disposal method which can collect useful material efficiently from \*\*\*\* (mainly fish meat, the intestines, a bone, a scale, etc.).

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[Translation done.]



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## MEANS

[Means for Solving the Problem]To achieve the above objects, this invention is characterized by that a \*\*\*\* processing unit used in order that a \*\*\*\* processing unit of the invention in this application (Claim 1) may collect useful resources, such as fish oil, amino acid, various organic acid, from \*\*\*\* comprises the following.

A breaker which cracks a \*\*\*\* raw material in the shape of minced meat.

A reactor which is cracked in the shape of minced meat with a breaker, and heats a minced meat-like raw material adjusted to a range whose moisture content is 60 to 92 % of the weight at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform.

Separating mechanism which separates useful material from a reaction treatment object which carried out hydrothermal reaction in said reactor.

[0007]A breaker with which a \*\*\*\* processing unit of the invention in this application (Claim 1) makes a \*\*\*\* raw material the shape of minced meat, A reactor which heats a minced meat-like raw material with which moisture content was adjusted at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform, From a reaction treatment object which carried out hydrothermal reaction in a reactor, it has separating mechanism which separates an oil phase, aqueous phase, and at least one phase in solid phase, By heating \*\*\*\* to subcritical temperature and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, It becomes possible efficiently separation and to collect or to collect aqueous phase which useful components, such as nutriment, dissolved about an oil phase which contains fatty acid, such as DHA contained in \*\*\*\*, and EPA, at a high rate, and enables it for most to process efficiently \*\*\*\* by which incineration processing was carried out, and to carry out useful recycling conventionally.

[0008]In the invention in this application, \*\*\*\* is a large concept containing the body of a fish, a head of a fish, a bone, internal organs, a hide, a scale, etc., and there are no restrictions special to a ratio of each part, etc. In the invention in this application, a breaker is the shape of minced meat (with "the shape of minced meat") about a \*\*\*\* raw material. In the invention in this application, it is not what is restricted in the case of what is called a minced meat state, It is possible to use a thing of various mechanisms which MINSA etc. which are carried out for being with a large concept including granular type voice etc. which were broken finely are meant, and there are no restrictions special to the concrete composition, and can crack and split-ize a \*\*\*\* raw material.

[0009]In the invention in this application, it is possible to use as a reactor an autoclave type thing provided with an agitator and a thing of various structures, such as a reactor (tube type reactor) of structure where a tube of predetermined length was bent in the shape of a winding path. When it is considered as structure which carries out the flange connection of the important section when using a tube type reactor and enables it to separate a straight pipe part and a bent part, while becoming possible to correspond promptly at the time of a blockade, etc., it becomes possible to maintain easily. Since it will become possible to make it react efficiently in short time while becoming easy to respond to continuation-ization if a tube type reactor is used, it becomes possible to attain miniaturization of a device and it becomes possible to reduce facility cost.

[0010]In the invention in this application, separating mechanism is a concept meaning a means which can separate and collect an oil phase, aqueous phase, and at least one phases in solid phase from a reaction treatment object which carried out hydrothermal reaction in a reactor. It is possible to use various means which can separate useful material from a reaction treatment object as separating mechanism, and there are no restrictions special to the concrete composition.

[0011]Solid phase which can be collected in a \*\*\*\* processing unit of the invention in this application

such as lactic acid and peptide, various organic acid, and water soluble protein. An oil phase contains high fatty acid of especially added value like DHA or EPA, etc.

[0012] That cooking temperature of a reactor is 200–280 °C in the invention in this application, If amino acid is called originally or various organic acid, fish oil, etc. cannot fully be collected and cooking temperature exceeds 280 °C when cooking temperature is less than 200 °C, it will be because a generated amount of fish oil containing a high-value-added substance decreases and a generated amount of amino acid contained in aqueous phase also decreases. However, it is important for a reaction temperature region to give width to an operating-temperature region by the side of a processing unit from there being a suitable field according to a fish stock, a season, etc. according to each conditions.

[0013] Although reaction time calls at cooking temperature, a part of °C, etc., it is usually desirable to be referred to as about 10–15 min. However, there are no restrictions special to reaction time.

[0014] Trying to adjust moisture content to 60 to 92% of the weight of a range. If mobility will fall, handling will become difficult, if moisture content will be 60 or less % of the weight, and moisture content exceeds 92 % of the weight, handling quantity, such as the amount of supply to a reactor, will increase, enlargement of equipment will be caused, and it will be because it is not desirable.

[0015] Before said reactor is presented with a °C processing unit of Claim 2, it is characterized by having a preheating treatment means to heat-treat said minced meat-like raw material preparatorily.

[0016] It becomes possible by forming a preheating treatment means, and heat-treating a minced meat-like raw material preparatorily, before a reactor is presented to raise contacting efficiency with water of a subcritical state, and to make an efficient hydrolysis reaction perform. Therefore, directly, when supplying an unheated minced meat-like raw material to a hot reactor, it is compared, it becomes possible to make hydrothermal reaction stable in a reactor perform, and the invention in this application can be effected more.

[0017] A °C processing unit of Claim 3 is characterized by said separating mechanism being what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in said reactor.

[0018] In a °C processing unit of the invention in this application, it is possible to use what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in a reactor as separating mechanism like Claim 3. It is also possible to use separating mechanism which is one unified mechanism which can separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object as separating mechanism, for example. In a case where it is possible to separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object, For example, it is also possible to use a thing etc. of composition of to have had the first step of separation mechanism which separates only any one phase of an oil phase, aqueous phase, and the solid phase, and a separation mechanism which separates two phases which remained after that from a reaction treatment object, and there are no restrictions special to the concrete composition.

[0019] This invention is characterized by that a °C disposal method for a °C disposal method of the invention in this application (Claim 4) to collect useful resources, such as fish oil, amino acid, various organic acid, from a °C raw material comprises:

A minced meat-like raw material preparation process which adjusts moisture content to 60 to 92% of the weight of a range while cracking a °C raw material in the shape of minced meat.

The 1st reaction process that heats a minced meat-like raw material prepared by said minced meat-like raw material preparation process at 150–200 °C under application of pressure and to which hydrothermal reaction is made to carry out.

The 1st partition process that divides a reaction treatment object which carried out hydrothermal reaction in said 1st reaction process into phases (henceforth "solid phase and an oil phase"), such as solid phase other than aqueous phase and aqueous phase, and an oil phase, or is divided into phases other than an oil phase and an oil phase.

From aqueous phase separated by said 1st partition process. [ whether water-soluble useful components, such as phosphoric acid and lactic acid, are collected and ] Or a mixture of a recovery process which collects oil phases separated by said 1st partition process, solid phase and an oil phase which were separated by said 1st partition process, and aqueous phase after collecting water-soluble useful components by said recovery process, Or the 2nd reaction process that heats phases (aqueous phase and solid phase) other than an oil phase separated by said 1st partition process at 230–280 °C under application of pressure and to which hydrothermal reaction is made to carry out

[0020]A minced meat-like raw material which made a \*\*\*\* raw material the shape of minced meat, and adjusted moisture content by the 1st reaction process. Heat at 150-200 \*\* under application of pressure, make hydrothermal reaction perform, and a reaction treatment object by the 1st partition process. [ whether it separates into aqueous phase, and solid phase and an oil phase, and ] Or from aqueous phase separated by a recovery process after separating into phases other than an oil phase and an oil phase. [ whether useful components, such as phosphoric acid and lactic acid, are collected and ] By or the 2nd reaction process after collecting oil phases separated by the 1st partition process. A mixture of solid phase and an oil phase separated in the 1st partition process, and aqueous phase after collecting water-soluble useful components by a recovery process, Or it becomes possible to separate and collect useful material from a reaction treatment object efficiently by heating phases other than an oil phase separated in the 1st partition process at 230-280 \*\* under application of pressure, and making hydrothermal reaction perform.

[0021]Namely, a mixture of the 1st reaction process made to react at 150-200 \*\*, solid phase and an oil phase which were separated by the 1st partition process, and aqueous phase after collecting water-soluble useful components by a recovery process, Or when it has composition provided with the 2nd reaction process to which phases other than an oil phase separated by the 1st partition process are made to react at 230-280 \*\*, (a) While collecting water-soluble useful components of phosphoric acid, lactic acid, protein, etc. from aqueous phase separated by the 1st reaction process in a comparatively low temperature (150-200 \*\*), Solid phase and an oil phase separated by the 1st partition process, and aqueous phase after collecting useful components by a water-soluble useful component recovery process by carrying out hydrothermal reaction at an elevated temperature (230-280 \*\*) by the 2nd reaction process, Become possible to separate and collect efficiently high useful material of added value of fish oil, amino acid, various organic acid, etc., etc., and a reaction treatment object which carried out hydrothermal reaction in the (b) 1st reaction process is divided into phases other than an oil phase and an oil phase, While collecting oil phases, it becomes possible to separate and collect efficiently high useful material of added value of fish oil, amino acid, various organic acid, etc., etc. also by carrying out hydrothermal reaction of the phases (aqueous phase and solid phase) other than an oil phase separated by the 1st partition process at an elevated temperature (230-280 \*\*) according to the 2nd reaction process. Corresponding to a difference in a \*\*\*\* raw material (a kind of fish, and a difference in a part), etc., a processing mode of the above (a) and (b) is a mode which can be chosen suitably, and can determine whether to consider it as which mode according to concrete conditions.

[0022]That cooking temperature of the 1st reaction process is 150-200 \*\* in a \*\*\*\* disposal method of the invention in this application (Claim 4), If there is much ullage of solid content, and amino acid callable originally or various organic acid, fish oil, etc. cannot fully be collected and cooking temperature exceeds 200 \*\* when cooking temperature is less than 150 \*\*, it will be because a recovery amount of lactic acid and phosphoric acid which are contained in aqueous phase decreases.

[0023]It will be because a generated amount of fish oil or amino acid decreases that cooking temperature of the 2nd reaction process is 230-280 \*\*, if it becomes insufficient generating of useful fish oil or various amino acid and cooking temperature exceeds 280 \*\*, when cooking temperature is less than 230 \*\*. Although reaction time in the 1st reaction process calls at a part of \*\*\*, etc., Usually, it is possible to make a reaction required as the 1st reaction process perform at about 5-10 min, and although reaction time in the 2nd reaction process calls at a part of \*\*\*, etc., it is possible [ reaction time ] to make reaction sufficient by about 10-15 min usually perform.

[0024]This invention is characterized by that a \*\*\*\* processing unit used in order that a \*\*\*\* processing unit of the invention in this application (Claim 5) may collect useful resources, such as fish oil, amino acid, various organic acid, from a \*\*\*\* raw material comprises:  
A breaker which makes a \*\*\*\* raw material the shape of minced meat.

The 1st reactor that is cracked in the shape of minced meat with a breaker, and heats a minced meat-like raw material adjusted to a range whose moisture content is 60 to 92 % of the weight at 150-200 \*\* under application of pressure and to which hydrothermal reaction is made to perform. The 1st separating mechanism that solid phase other than aqueous phase and aqueous phase, an oil phase, etc. carry out phase (henceforth "solid phase and oil phase") separation of the reaction treatment object which carried out hydrothermal reaction in said 1st reactor, or is divided into phases other than an oil phase and an oil phase.

Water-soluble useful components, such as phosphoric acid and lactic acid, are collected from

separated by said 1st separating mechanism, A mixture of aqueous phase after said recovery means recovers a water-soluble useful component, Or the 2nd separating mechanism that separates useful material from a reaction treatment object which carried out hydrothermal reaction in the 2nd reactor that heats phases (aqueous phase and solid phase) other than an oil phase separated by said 1st separating mechanism at 230-280 \*\* under application of pressure, and to which hydrothermal reaction is made to perform, and said 2nd reactor.

[0025]A \*\*\*\* processing unit of the invention in this application (Claim 5) as mentioned above A breaker, A reaction treatment object which carried out hydrothermal reaction in the 1st reactor that heats a minced meat-like raw material at 150-200 \*\*, and to which hydrothermal reaction is made to perform, and the 1st reactor is divided into solid phase and oil phases other than aqueous phase and aqueous phase, Or from aqueous phase separated by the 1st separating mechanism divided into phases other than an oil phase and an oil phase, and the 1st separating mechanism. [ whether water-soluble useful components, such as phosphoric acid and lactic acid, are collected and ] Or a mixture of a recovery means which collects oil phases separated by the 1st partition process, solid phase and an oil phase which were separated by the 1st separating mechanism, and aqueous phase after a recovery means recovers a water-soluble useful component, Or the 2nd reactor that heats phases (aqueous phase and solid phase) other than an oil phase separated by the 1st separating mechanism at 230-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform, Since it has the 2nd separating mechanism that separates useful material from a reaction treatment object which carried out hydrothermal reaction in the 2nd reactor, it becomes possible to enforce a \*\*\*\* disposal method of Claim 4 certainly, and to separate and collect efficiently high useful material of added value of fish oil, amino acid, various organic acid, etc., etc. from \*\*\*\*.

[0026]Before said 1st reactor is presented with a \*\*\*\* processing unit of Claim 6, it is characterized by having a preheating treatment means to heat-treat said minced meat-like raw material preparatorily.

[0027]It becomes possible by forming a preheating treatment means, and heat-treating a minced meat-like raw material preparatorily, before the 1st reactor is presented to raise contacting efficiency with water of a subcritical state, and to make an efficient hydrolysis reaction perform. Therefore, directly, when supplying an unheated minced meat-like raw material to the 1st reactor, it is compared, it becomes possible to make hydrothermal reaction stable in the 1st reactor perform, and the invention in this application can be effected more.

[0028]A \*\*\*\* processing unit of Claim 7 is characterized by said 2nd separating mechanism being what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in said reactor.

[0029]In a \*\*\*\* processing unit of the invention in this application, it is possible to use what separates an oil phase, aqueous phase, and at least one phase in solid phase from a reaction treatment object which carried out hydrothermal reaction in a reactor as the 2nd separating mechanism like Claim 7. It is also possible to use separating mechanism which is one unified mechanism which can separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object as separating mechanism, for example. In a case where it is possible to separate and collect each of an oil phase, aqueous phase, and solid phase from a reaction treatment object, For example, it is also possible to use a thing etc. of composition of to have had the first step of separation mechanism which separates only any one phase of an oil phase, aqueous phase, and the solid phase, and a separation mechanism which separates two phases which remained after that from a reaction treatment object, and there are no restrictions special to the concrete composition.

[0030]

[Embodiment of the Invention]The place which shows the embodiment of the invention in this application and by which it is characterized [ the ] hereafter is explained in more detail.

[0031][Embodiment 1] Drawing 1 is a figure showing the composition of the \*\*\*\* processing unit concerning one embodiment of the invention in this application. The \*\*\*\* processing unit A of this embodiment is provided with the following.

The breaker 10 which is a device for collecting useful resources, such as fish oil, amino acid, various organic acid, from oh [ fish ] (the head of a fish, a bone, internal organs, a hide, a scale, etc.), and cracks a \*\*\*\* raw material in the shape of minced meat.

The reactor 20 which heats the minced meat-like raw material cracked in the shape of minced meat with the breaker 10 at 200-280 \*\* under application of pressure and to which hydrothermal reaction is made to perform.

carried out hydrothermal reaction in the reactor 20.

Although the autoclave type thing provided with the agitator is used as the reactor 20 in this embodiment, it is also possible to use the tube type reactor of the structure where the tube of predetermined length was bent in the shape of a winding path. Since the content of a solid decreases extremely depending on the kind of \*\*\*, the decanter 32, the three-phase-circuit separator 33, the cushion tank 34, etc. which constitute separating mechanism may become unnecessary.

[0032] And in this \*\*\* processing unit A, in order to adjust the moisture content of a minced meat-like raw material (for example, it adjusts to 60 to 92 % of the weight of water content), the feed water line 12 which supplies water to the supply line 11 of the minced meat-like raw material cracked in the shape of minced meat with the breaker 10 is allocated. It is also possible for there to be no restrictions in particular in the addition position of water, and to constitute as additive water required for the breaker 10, so that the aqueous phase after separation may be reused.

[0033] Through the slurry pump 13, the minced meat-like raw material is constituted so that the reactor 20 may be supplied, and before the reactor 20, the preheating treatment means (pre cooker) 14 for heat-treating a minced meat-like raw material preparatorily is allocated. The condensator 21 is allocated by the lower part of the reactor 20, and the pressure reduction system 22 is allocated in the outlet side of the reactor 20.

[0034] The decanter 32 as for which the separating mechanism 30 decants separated liquid with a high rate of solid phase of having been separated by the separation tank 31 and the separation tank 31, While supplying the upper layer liquid of the separation tank 31 and performing separation of an oil phase and the aqueous phase, it comprises the three-phase-circuit separator 33 etc. which also perform separation of a little solid phase. Sludge with high solid phase part concentration separated with the decanter 32 is constituted so that it may be returned to the supply line 11 of a minced meat-like raw material. After being able to store to the cushion tank 34, the aqueous phase containing a little oil phases separated with the decanter 32 is constituted so that it may be sent to the three-phase-circuit separator 33.

[0035] After processing a \*\*\* raw material in the shape of minced meat with the breaker 10 using the \*\*\* processing unit A of the above-mentioned embodiment, the minced meat-like raw material which adjusted moisture content is supplied to the reactor 20. While the high oil phase of the added value containing good organic acid etc. is recoverable from a reaction treatment object by heating and carrying out hydrothermal reaction (subcritical hydration moisture solution reaction) to 200–280 \*\* under application of pressure, it becomes possible to collect the aqueous phase which water soluble protein dissolved. Although the solid phase to which the aqueous phase adhered is discharged from the three-phase-circuit separator 33, it is possible to also dry this solid phase and to use as manure or feed.

[0036] [Embodiment 2] Drawing 2 is a figure showing the composition of the \*\*\* processing unit concerning other embodiments of the invention in this application. The breaker 10 which the \*\*\* processing unit B of this Embodiment 2 is a device for collecting useful resources, such as organic acid, from oh [ fish ] (the head of a fish, a bone, internal organs, a hide, a scale, etc.), and cracks a \*\*\* raw material in the shape of minced meat. The 1st reactor 110 that heats a minced meat-like raw material at 150–200 \*\* and to which hydrothermal reaction is made to perform. The 1st separating mechanism 130 that divides into solid phase and oil phases other than the aqueous phase and the aqueous phase the reaction treatment object which carried out hydrothermal reaction in the 1st reactor 110. The recovery means 150 which collects useful components, such as phosphoric acid and lactic acid, from the aqueous phase separated by the 1st separating mechanism 130. The 2nd reactor 120 that heats the solid phase and oil phase separated by the 1st separating mechanism 130, and the aqueous phase after the recovery means 150 recovers a useful component at 230–280 \*\* and to which hydrothermal reaction is made to perform. From the reaction treatment object which carried out hydrothermal reaction in the 2nd reactor 120, it has the 2nd separating mechanism 140 that separates useful material. The condensator 111, 121 is allocated by the lower part of the 1st reactor 110 and the 2nd reactor 120, respectively. It is also possible to have composition which formed the oil phase recovery line 131 for collecting oil phases to the 1st separating mechanism 130.

[0037] This Embodiment 2 uses the thing of an autoclave type structure provided with the agitator as the reactors 110 and 120, and it is also possible to use the tube type reactor of the structure where the tube of predetermined length was bent in the shape of a winding path. By continuation-izing a process, using a tube type reactor as a reactor, hydrothermal reaction is made to perform efficiently and it becomes possible to attain miniaturization of a device.

mentioned Embodiment 1, and was separated by the separation tank 31 and the separation tank 31, While supplying the upper layer liquid of the separation tank 31 and performing separation of an oil phase and the aqueous phase, it has the three-phase-circuit separator 33 etc. which also perform separation of a little solid phase.

[0039] Other composition is the same as the composition of the \*\*\*\* processing unit A of the above-mentioned Embodiment 1 shown in drawing 1, and in order to avoid duplication, explanation of each part is omitted. In drawing 2, the portion which attached drawing 1 and identical codes shows the same portion as drawing 1, or the corresponding portion.

[0040] After processing a \*\*\*\* raw material in the shape of minced meat with the breaker 10 using the \*\*\*\* processing unit B of the above-mentioned embodiment, the minced meat-like raw material which adjusted moisture content is supplied to the 1st reactor 110. After heating at 150-200 \*\* under application of pressure and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, a reaction treatment object The aqueous phase, The solid phase and oil phase which separated into portions, such as solid phase other than the aqueous phase, and an oil phase, and was separated from the separated aqueous phase by the 1st separating mechanism 130 after collecting useful components, such as phosphoric acid and lactic acid. By supplying the aqueous phase after the water-soluble useful component recovery means 150 recovers a useful component to the 2nd reactor 120, heating it at 230-280 \*\* under application of pressure, and making hydrothermal reaction (subcritical hydration moisture solution reaction) perform, While the high oil phase of the added value containing good organic acid etc. is efficiently recoverable, the aqueous phase which water soluble protein dissolved is efficiently recoverable. Although the solid phase to which the aqueous phase adhered is discharged from the three-phase-circuit separator 33, this solid phase can also be dried and it can use as manure or feed.

[0041] The solid phase and oil phase separated by the 1st partition process while collecting useful components, such as phosphoric acid and lactic acid, from the aqueous phase in the above-mentioned embodiment, after dividing a reaction treatment object into the aqueous phase, and solid phase and an oil phase with the 1st partition process, Although the mixture of the aqueous phase after collecting water-soluble useful components by a recovery process is heated at 230-280 \*\* under application of pressure by the 2nd reaction process and he is trying to make hydrothermal reaction perform, It is the 1st partition process about the reaction treatment object after making the kind of \*\*\*\* raw material, etc. perform hydrothermal reaction by the 1st reaction process, After separating into phases other than an oil phase and an oil phase and collecting oil phases, phases other than the oil phase separated by the 1st partition process by the 2nd reaction process. It heats at 230-280 \*\* under application of pressure, and it is also possible to constitute so that hydrothermal reaction may be made to perform, and useful material can be efficiently separated and collected from a reaction treatment object also in such a case.

[0042] As mentioned above, in the \*\*\*\* processing unit B of this Embodiment 2, Since it has composition provided with two reactors, the 1st reactor 110 and the 2nd reactor 120, compared with the case where it is made to react in one step, it becomes possible like [ in the case of the above-mentioned Embodiment 1 ] to collect useful material, such as still more efficient and good organic acid.

[0043] Oh [ the \*\*\*\* processing unit B of this Embodiment 2 is used, and / fish ] (70% of internal organs)! When the minced meat-like \*\*\*\* raw material (57% of moisture content) prepared from 30% of the bony septum is processed at a rate of 20 kg/hr, from the aqueous phase separated in the \*\* 1st separating mechanism. In [ phosphoric acid is collected by 0.12 kg/hr and lactic acid is collected at a rate of 0.05 kg/hr, and ] the \*\* 2nd separating mechanism, The oil phase containing DHA, EPA, etc. (a) 2.7 kg/hr, (b) water soluble protein, and pyroglutamic acid, The aqueous phase containing organic acid, such as an alanine, a glycine, and cystine, amino acid, water soluble protein, etc. was collected by 11.4 kg/hr, and (c) solid content was collected at a rate of 4.87 kg/hr.

[0044] The invention in this application is not what is limited to each of above-mentioned Embodiments 1 and 2, the kind of \*\*\*\* which should be processed, and a part (for example, the kind of fish by the texture of a fish white [ such as a fish of lean, such as a tuna, a sea bream, and a bastard halibut, ] etc..) Breakers, such as parts, such as the head, internal organs, and a bone, and a ratio of those, a reactor (the 1st reactor and the 2nd reactor), The form of each members forming, such as separating mechanism, structure, the moisture content of a minced meat-like raw material, It is possible for it to be related with the kind etc. of the oil phase which should be separated and collected, the aqueous phase, and solid phase, and to add various application and modification within the limits of the gist of the invention for the kind of reaction treatment object, and the kind of

and a minced meat-like raw material, and the reaction treatment object which carried out hydrothermal reaction.

[Translation done.]

\* NOTICES \*

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a figure showing the composition of the \*\*\* processing unit concerning one embodiment of the invention in this application.

[Drawing 2]It is a figure showing the composition of the \*\*\* processing unit concerning other embodiments of the invention in this application.

[Description of Notations]

A and B \*\*\* processing unit

10 Breaker

11 The supply line of a minced meat-like raw material

12 Feed water line

13 Slurry pump

14 Preheating treatment means (pre cooker)

20 Reactor

21 Condensator

22 Pressure reduction system

30 Separating mechanism

31 Separation tank

32 Decanter

33 Three-phase-circuit separator

34 Cushion tank

110 The 1st reactor

111 Condensator

120 The 2nd reactor

121 Condensator

130 The 1st separating mechanism

131 Oil phase recovery line

140 The 2nd separating mechanism

150 Recovery means

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[Translation done.]

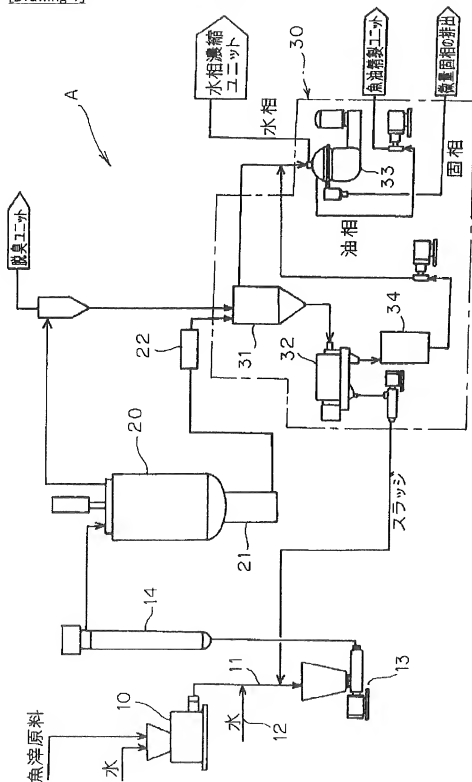


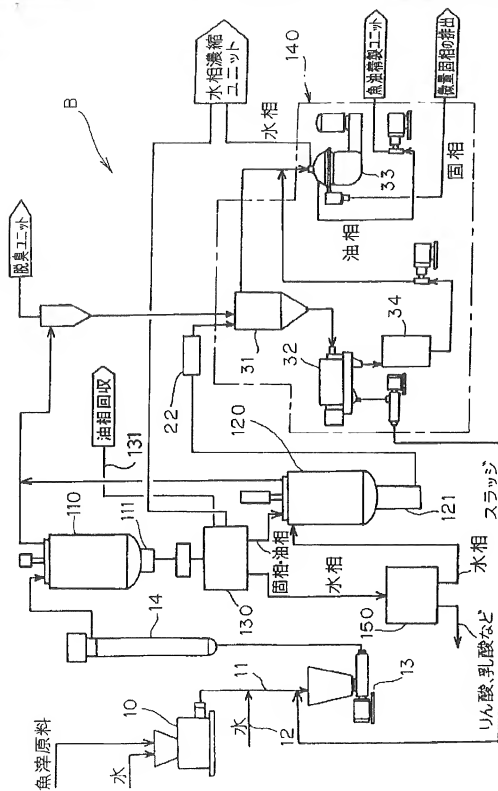
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## DRAWINGS

[Drawing 1]





[Translation done.]